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1. Our basis of reference seems to me to afford a good opening for discussing how far, and in what sense, a *unified* theory of the universe is possible. As against the two extreme views (*a*) that such unification must be achieved exclusively in mechanistic terms, or (*b*) that, failing this, we must admit absolute discontinuities in the scheme of things, I shall try to argue for unification by correlation of differences—a concept of the universe as, so to speak, a stratified system, implying an order, in which differences may be correlated with, but can not be dissolved into, each other.

2. On this basis, therefore, it will be possible to argue (*a*) for the "autonomy of life," *i. e.*, of the characteristic concepts which biology needs in order to give an adequate theory of the living as distinct from the non-living; (*b*) for mechanical and biological concepts as complementary and "cumulative," not as mutually exclusive. I accept the view that the phenomena of life rest on physico-chemical mechanisms, but I insist that they must also be dealt with *in their own terms*, and that we should not regard it as the ideal of science some day to be able to discard, *e. g.*, the terms appropriate to the theory of animal or human behavior in favor of an account expressed exclusively in terms of physico-chemical formulæ. This recognition of the "autonomy of life," which seems to me the empirical truth in Vitalism, does not, I think, necessitate the concepts of a specific vital force, or vital energy, or Drieschian entelechy.

3. It does, however, raise the problem of the sense in which teleological concepts are applicable. To eliminate from biology the concept of purpose, so as to retain solely the concept of cause and effect, involves, I shall try to argue, an undeniable loss. My argument will require (*a*) a brief analysis of the concepts of determinism and causality, especially as employed in experimental research; (*b*) the attempt to establish a sense of "purpose" which does not imply conscious design, still less a designer, after the manner of the old physico-theological proof. A comparison of machines in the strict sense, *i. e.*, man-made artefacts, and living organisms will here be found relevant, and throw light on the general relation of mechanical to teleological concepts.

REVIEWS AND ABSTRACTS OF LITERATURE

Applied Psychology. H. L. HOLLINGWORTH and A. T. POFFENBERGER. New York and London: D. Appleton and Company. 1917. Pp. xiii + 337.

Psychology has indeed become a subject of great and widespread interest to-day to the popular mind. An increasing number of people are desirous of making a real application of it to the actual affairs and problems of daily life. Naturally they look to the experience and instruction of our schools of psychology to teach them how this is to be done. Naturally also they cherish a hope of great things which are to be accomplished to make the struggle for existence more effective and less burdensome. In how far are the schools equal to their opportunity?

The present volume is an attempt to set forth concisely but comprehensively the plane of advance which applied psychology has reached, the principles of psychology and the psychological facts upon which it bases itself, and then its contact with various departments and activities of modern life. The behavior of man forms the objective starting point for such a psychological approach to these practical concerns and to the psychical factors underlying it. This involvès the discussion of the general principles of behavior, the elements which go to make up this behavior, that is the acquisition of elements through inheritance and individual experience, and finally the ways by which behavior may in any situation be controlled.

A brief review of the history of applied psychology notes the vague psychological interest in the workings of the mind upon daily problems which has always occupied even popular thought, the early attempt to transfer methods and findings from the psychological laboratory into other fields, with later the interest in studying actual daily material of practical life in which experiments are carried on. These, however, the authors complain, still fail to take sufficient account of the human factor as it actually exists in relation to the practical subjects in hand. This is a problem of great complication and under the influence of many factors. Furthermore, as is pointed out, psychology has properly to do with the means to an end, not with any judgment concerning the end itself.

Such being the outline of the book, the authors discuss some of these factors which must be taken into consideration. First of these is heredity, which is manifest in somatic reflex activities, in instincts, which are enumerated as part of original equipment, physical inheritance, as confined to family likenesses, where mental inheritance also manifests itself. The modification of inherited traits, particularly in original tendencies to action, is also the subject largely of experimental study especially as revealed in the process of learning by trial and error, choice of efficient movements and elimination of those which hinder efficiency and skill, the influence in this of pleasure and dissatisfaction, the use of memory, proper distribution of time and effort and the presence of an intention or "will to learn."

Whether these processes are influenced by age or sex, how far environmental conditions, such as temperature and humidity, play a rôle in learning and efficiency, the condition of fatigue, its meaning, its control and regulation and the importance of considering its influence, these are all set forth as they broaden the field for psychological investigation and touch the application of it to industrial and other practical affairs. Some experiments have also been made in regard to various drugs and stimulants and their effect upon the mental processes, as they are observed in the laboratory or in practical life.

The methods of applying psychology to social problems depend first on an analytic attitude toward the materials and tasks in hand, and then must utilize the knowledge of material and processes acquired employing the psychological technique. The authors then go on to show how this can be utilized in the executive management of industrial affairs, in the activity of the workman himself and the reaching of the public as the market of supply. Further the same principles apply to law, medicine and education.

The chief criticism to be directed against the book is that which refers to this laboratory effort of psychology as a whole. The writers themselves have felt it and anticipated it when they refer now and then to the lack of attention to the human equation. How far this latter lifts every one of these problems out of the realm of mechanically tested facts and sets them far beyond evaluation and control through merely static measurements and conclusions even they fail to appreciate. It is just this larger factor that separates psychology inevitably from the more exact sciences, even as biology itself is rendered elusive, fluctuating, to some extent unpredictable, because it deals with living substances in a state of constant flux. Even more psychology, properly to fulfil its task and reach results which actually affect human processes, must keep itself in appreciative touch with such an inherent dynamism, of far greater extent in the mental life, and ever on the alert for the surprise and the unpredictability of the human element.

Yet, even as laws are discoverable in the biological realm, so does mental life itself express lawful activities which have formed themselves out of the mass of experiences which organic beings, in the end human beings, have accumulated to themselves through eons of psychic experiences. Such a gentic view of the subject shows at once how futile is then the application of such limited laws as appear in behavior considered from the point of view of immediate consciousness, which can be expressed only in superficial measurements. The authors hint more than once of factors out of past inheritance. Every one must, of course, admit them. Why, then. do they not follow them up; why does not the science of psychology, if it will make itself truly applicable to daily living and occupation, take these into account as vital, dynamic factors giving to behavior its set and its motive power?

The chapter on influence of drugs is plain in its testimony to the influence of the individual mode of response, individual adaptation to any environmental factor in the service of purpose and use, which so modifies the effect of that factor that static conclusions are rendered valueless. It is a matter of informing interest within to which too little attention is paid. Plasticity and pliability of adaptation are the most efficient characteristics of living matter and have developed with evolution to give the human race its ascendancy. They are controlled and governed by interest and through it they give to the individual his efficiency or, wrongly directed, condition his failure. Here, then, is the effective factor in all psychological application, whether to business, education, medicine or what not. Why, if there is interest, it may be asked, can we then speak of its failing? This is one of the neglected points of laboratory psychology. There is an unyielding tendency in psychologists, as in the rest of mankind, to refuse to recognize and admit all the channels of this interest. Culture, as well as the practical affairs of life, have been too intent upon attaining momentary efficiency and security, to stop to consider from where such efficiency came, to recognize other concealed interests which also play continually upon external interests and too often distract and confuse. Conceiving interest, however, as merely an expression for the value of an energy, indestructible and therefore only transposable, in the purposes of life, it can be seen that interest may be in the task in hand or it may have retreated to other secret occupations.

Psychology's task, therefore, becomes much more human, much deeper and broader, even in fitting the telegrapher to his task, when the dynamic possibilities within any individual, psychology's material, are realized. It means more emphasis laid upon the human being as a sum of such active, constantly playing factors, in the terms of an easily shiftable and transmutable energy. It means the finding and following of a controlling interest sufficiently motivated from the great impulses alive in every human being and individually accentuated according to that individual's peculiar circumstances and inheritance. The realization of the power of human purpose and the need and possibility of its guidance and control through enlistment of distracting forms of interest, which are also naturally present, into some main channel of efficiency, this is the practical implement of service in the hands of the experimental psychologist. Tests of response to certain environmental factors, such as those listed here, may aid to a certain extent if the larger view is kept in mind, but they are disappointingly futile and limited in themselves for reaching human dynamic possibilities and directing them upon work or the solving of problems. Like intellectual so-called "mental tests" they take small account of factors actually and always at work. The latter can at best form but a limited initial stage to deeper research into controlling affective factors, upon which even intellect rests. In regard to environmental conditions, they have always been, and nowhere more than in present war conditions do they show themselves such, sources of stimuli and endeavor far more than forces themselves in control of the individual.

The aim of this book is as the first gleaming of light in the right direction. More than other works on applied psychology it points to a gathering together of all the elements which make up human psychical life for the psychologist's consideration. Nevertheless, it is only barely suggestive. Certain spheres to which it briefly refers could perhaps throw the flame much further could experimental psychologists grasp more fully the psychical unity in human society. Then, for example, child psychology would reveal these same dynamic elements at work in earlier stages, animal psychology would more effectually than now accomplish the same thing and so would anthropological psychology, in still another plane. Then also medical psychology would not be viewed even yet somewhat askance as dealing with a separated class of individuals. Inefficiency to construct a taking advertisement for subway publicity would be viewed as but one phase and a hysterical illness as another of an inffectualness to meet the particular task in hand which life demanded, and the largely unconscious attempt on the part of either individual to substitute other interests, and the reactions which furthered them, for the interest demanded by the task or mode of life in hand. Disease and inefficiency used as synonymous terms have much light to throw upon each other, and though they may represent widely different degrees yet they are expressions of the same form of reaction. An inquiring active public will welcome all effectual effort to discover and control the factors of human behavior, of human psychical activity, but let it go deep enough and itself show sufficient breadth and plasticity to effect its ends with the adaptable material with which it has to do.

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